Clinical research

Designing an intervention to prevent suicide: PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial)

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Suicide is a major public health problem with greatest risk in the very old. This paper describes an approach to reducing the risk of suicide by intervening on depression in elderly primary care patients. Depression is an appropriate target for an intervention as it is highly prevalent in primary care, is a strong risk factor for suicide, and is more often than not inadequately treated. PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial) is a National Institute of Mental Health (NIMH)–funded collaborative study that is testing this approach to suicide risk prevention in 18 primary care practices in the United States. PROSPECT's intervention of "guideline management" introduces a health specialist into the primary care setting to help physicians provide "on-time, on-target" treatment and long-term management of late-life depression following structured clinical guidelines. The effectiveness of the intervention in reducing suicidal risk and depression is evaluated by following a representative sample of older patients identified using a 2-stage design.

The risk of suicide climbs dramatically in old age in most industrialized nations, with the highest rates found among the very old and especially among men.[1] In the US, the suicide rate in white men aged 80 to 84 years is more than 5 times higher that in the total population.[2] This paper describes the methodology of PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial), an intervention study modeled on the premise that the most effective approach to deterring a rare but devastating event like late-life suicide is in eliminating its primary risk factor: depression. PROSPECT tests an intervention designed to facilitate "on-time, on-target" treatment for late-life depression in primary care patients. The intervention's effect is evaluated using a longitudinal study design that integrates population-based methodology with clinically sensitive assessment in patients from 18 diverse primary care practices.

The following pages first describe the logic behind PROSPECT's aims and methodology. A major focus of this first section is identifying targets of a suicide prevention intervention. The second section describes the intervention being tested by PROSPECT and the methodology being used to investigate the impact of the intervention on suicide risk.

The problem: suicide in late life

Identifying targets for intervention research

As the ninth leading cause of death among developed nations, suicide is a major public health problem.[3] A substantial amount of research in recent years, conducted

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from a number of academic vantage points, has coalesced to identify a variety of risk factors and correlates of suicide in late life.[4] These findings make it possible to develop and test suicide prevention strategies. A first step is to investigate whether there are subgroups of the population who are at very high risk, for whom focused intervention strategies are most needed and might have their greatest impact. In the case of suicide risk prevention, the extraordinarily high rates of suicide in the elderly justify designing an intervention for this group.

Selected abbreviations and acronyms

AHCPR	*Agency for Health Care Policy and Research*
CBT	*cognitive-behavioral therapy*
CESD scale	*Centers for Epidemiologic Studies Depression scale*
IPT	*interpersonal therapy*
IRCs	*Intervention Research Centers*
PAR	*population-attributable risk*
PROSPECT	*Prevention of Suicide in Primary Care Elderly: Collaborative Trial*
SSRIs	*selective serotonin reuptake inhibitors*

The next step is to identify an appropriate target for the prevention intervention. A useful strategy is to identify a risk factor that is common, strongly related to suicide risk, and is, in and of itself, malleable. The epidemiologic notion of "population-attributable risk" (PAR) may be useful to this argument. The PAR is an estimate of the proportion of all cases (eg, suicide) in a population than can be ascribed to a particular risk factor.[5] The PAR is a compound measure reflecting the relative risk and the frequency (prevalence) of the factor in the population. A factor may incur a very large risk for suicide, but be so rare in the target population that even a highly effective intervention-targeting condition may do little to reduce the overall rate of suicide in the population. Conversely, a significant risk factor for suicide may be very prevalent in the population (eg, living alone), but be so weakly associated with suicide risk that a successful intervention will also do little to reduce the overall rate of suicide in the population. Successfully intervening on a factor that both strongly affects the risk of suicide and occurs in a large number

of individuals would potentially reduce the overall suicide rates in the target population.

An effective public health suicide prevention strategy needs to identify a risk factor that is not only highly prevalent and strongly associated with suicide, but also changeable. Old age, male gender, living alone, widowhood, and other sociodemographic factors associated with suicide are difficult, if not impossible, to modify, making them inappropriate intervention targets (although, as noted above, potentially useful ways to narrow target populations). Depression, other psychiatric disorders, and access to firearms or other lethal methods are risk factors for suicide that are potentially amenable to change and thus potentially appropriate targets for an suicide prevention intervention. The purpose of intervention studies is to investigate both the extent to which the intervention does modify the risk factor and then whether changing the risk factor changes the outcome of interest. While the methodology for choosing a risk factor to target for an intervention draws heavily from epidemiologic and other observational sciences, the design of the intervention is informed by a wide range of sources, including naturalistic and controlled treatment studies as well as a wide range of other human, social, or organizational experiments.

Selecting depression in late life

PROSPECT aims to intervene on depression as a way of reducing the risk of suicide in late life because depression meets all three criteria for an intervention target: depression is strongly associated with the risk of suicide; late-life depression is relatively pervasive, ranging from 1% to 10% among community-dwelling elderly; and effective treatments for depression exist, but are not yet used adequately in the majority of cases of late-life depression. The following paragraphs elaborate on each of these points.

Several types of evidence point to depression in late life as a both potent and prevalent risk factor for suicide in late life. First, longitudinal studies of depressed psychiatric patients report suicide rates far higher than those in the general population. An estimated 6% to 15% of psychiatric patients with major depression die by suicide.[6] A 1-year follow-up study of psychiatric register cases observed that depressed patients aged 55 years or older had more than twice the rate of suicide

(475/100 000) than younger depressed patients (207/100 000).[7] A second type of data implicating depression as a risk factor for suicide comes from studies of suicidal behavior, including attempted suicide and other suicidal gestures. Although suicidal behavior does not always result in a completed suicide, it remains a very strong predictor of future completed suicides.[8] A study of a large population of patients in a health insurance group reported a suicide rate close to 5 times higher for patients with depression than the population rate. A third type of study reconstructs the psychological profiles of suicide victims. These psychological autopsy studies have found depression to be the most common psychiatric diagnosis in elderly suicide victims.[9,10] One study of elderly suicide victims noted that 76% had diagnosable psychopathology and, of these, 54% had major depression and 11% had minor depression.[9] Another psychological autopsy study confirmed that depression is the most likely psychiatric diagnosis in elderly suicide victims.[10]

Major depression and other forms of depressive symptomatology are highly prevalent in elderly primary care patients.[11] In general, the estimated prevalence of major depression—measured with both semistructured and structured interviews—in geriatric samples of primary care range between 6% and 9%.[12,13] A substantial proportion of the remaining elderly primary care patients report minor depression or other forms of subsyndromal depressive symptomatology. Minor depression is relevant to the study of suicide, in part because psychological autopsy studies of suicide victims report that depression in these cases was more often mild or moderate than severe. Older patients who report suicidal ideation have also been found to be depressed, but they are not always severely depressed or functionally impaired.[14] In addition, minor and other forms of subsyndromal depression have been associated with a variety of other adverse outcomes in older adults.[15,16]

Important to the choice of depression as an approach to suicide prevention is that depression in late life is treatable. Both pharmacological and psychotherapeutic approaches have demonstrated efficacy in the treatment of depression in late life. The introduction of selective serotonin reuptake inhibitors (SSRIs) has greatly enhanced the effectiveness of medication treatment because these drugs are safer and easier to administer than classic antidepressants. Randomized studies of SSRIs have included approximately 700 depressed elderly patients treated with fluoxetine, 450 with paroxetine, and 400 with sertraline.[17] Even when these drugs are not tolerated, their side effects consist of subjective discomfort rather than significant health risk to the patient. The safety in routine use and overdose,[18] and simplicity of administration of SSRIs, allow these agents to be used by nonspecialized physicians. SSRIs may be particularly effective in mild-to-moderate depression,[19] which constitutes the majority of cases of elderly suicide victims. In addition to pharmacotherapy, a variety of psychotherapies, including interpersonal therapy (IPT), cognitive-behavioral therapy (CBT), problem-solving therapy, and perhaps psychodynamic psychotherapies, also have demonstrated effectiveness in the acute treatment of depressed elderly outpatients.[20]

Equally relevant as acute treatment to suicide prevention may be the perspective of depression as a recurrent, chronic illness so that even when patients recover from an episode of depression the risk of recurrence is high. Like other chronic illnesses, strategies to monitor and maintain recovery may be essential to ongoing prevention of suicide risk.

Selecting the intervention setting: primary care

Primary care is an ideal setting for an intervention aimed at reducing the risk of suicide in the elderly population. As noted, the prevalence of depression is substantially higher in primary care patients than the general elderly population. Moreover, 88% of US residents above age 65 have visited a doctor's office within the past year.[21] Most important, 70% or more of elderly suicide victims were seen by their primary care physician within a month before their death.[1,4] Thus, primary care clinicians are positioned to intervene on very-high-risk patients.

Primary care is also an ideal target for intervention because depression is not being treated as well as it might be in primary care. Despite evidence that depression is prevalent and that treatments for depression are efficacious in primary care, late-life depression remains both underdiagnosed and undertreated in primary care settings. In mixed-age medical populations, only approximately 40% of depressed patients are identified by their physicians.[22,23] Any number of factors can contribute to underrecognition of depression in primary care.

Older patients may hold attitudes, or interpret their sensations or feelings, such that they are less likely to

report having the affective or ideation symptoms of depression. Compared with younger groups, older adults are less likely to report the affective symptoms of depression.[24,25] Instead, older adults are more likely to ascribe symptoms of depression to a physical illness.[26,27] Studies in the UK[28] have also found that patients may misunderstand treatments for depression (eg, believe that antidepressants are addictive), and therefore be less forthcoming with symptom reports to avoid treatments.

Schulberg and McClelland[29] reported a number of physician factors related to failure to recognize depression across a variety of patients. These included a lack of knowledge of the symptoms and management of depression, a focus on possible organic pathology, failure to elicit relevant affective, cognitive, or somatic symptoms, and underrating of the severity of depressive symptoms. A common reason for depression to be misdiagnosed in primary care settings may be the frequently held assumption that the syndrome is a "natural" consequence of aging and its associated challenges. Shao and her associates recently reported on attitudes about depression among faculty physicians who were generalists (general medicine internists and family physicians) or nongeneralists (medicine subspecialists and obstetricians-gynecologists), as well as psychiatrists.[30] Over 90% of nongeneralists thought depression was understandable given the patient's medical and social situation—an attitude that posts a significant barrier to treatment particularly in the elderly.[31] Avoidance of stigmatization on the part of physicians also contributes to underdetection of depression. A significant proportion of primary care physicians report that they have intentionally avoided diagnosing a mood disorder even when recognized, in order to avoid stigmatizing the patient.[32]

Even when diagnosed, depression is inadequately treated in primary care, despite the availability of efficacious treatments for depression and guidelines for using these treatments. Studies suggest that both physicians and patients contribute to this problem. Approximately 11% of depressed high utilizers of primary care services receive adequate antidepressant treatment, while 34% received inadequate treatment and 55% received no treatment.[33] In a study of a large primary care practice, only 41% of patients identified by the physicians as depressed received any antidepressant treatment regardless of age and medical comorbidity.[34] In four Pittsburgh primary care centers, primary care physicians who were informed of depression diagnoses failed to provide any treatment to 27% of depressed patients.[35] When physicians did prescribe antidepressants, the prescriptions were of insufficient dosage and duration. Inadequate treatment can result not only from underprescribing, but also from lack of treatment adherence by the patient.[36] Meta-analysis of medication use studies showed a 35% nonadherence rate for antidepressant medication.[37] Poor treatment adherence is especially common in the elderly and may be both overuse and underuse.[38]

Case study

A case study, modeled after a real event, may help to illustrate some common features making depression in late life in primary care an appropriate target for intervention.

An elderly individual, typically a man (we will call him Mr Smith), is a 78-year-old widower, formerly a small business owner, who has lived alone since his wife died 4 years ago. He has an extensive medical history including pyloric stenosis, chronic obstructive pulmonary disease, and prostate and bladder cancer. Six weeks ago, Mr Smith underwent extensive abdominal and bladder surgery. Since returning home, Mr Smith has "given up hope on everything." He is no longer interested in reading, TV, or playing cards with his friends. He wishes he could sleep better but spends much of the night awake, worrying about his health and ruminating about his past. During the day, he eats sporadically, and finds himself too tired and lethargic to keep his home tidy. A proud man, he views his messy house, like his decaying body, as symbolic of how little his life is now valued. He wonders daily whether he should kill himself and, if he did, who would care. He has decided that if he does kill himself, the best way is with a gun. He has a rifle, left over from his hunting days, that he keeps in the bedroom closet. The ammunition is in a desk drawer.
Mr Smith is somewhat ashamed of these thoughts and keeps most of them to himself. At his doctor's visit, Mr Smith mentions only that he is having trouble sleeping and eating and feels a little lethargic. His physician responds that a loss of energy is normal given Mr Smith's age, his health problems, and the stress he has

experienced. He is concerned about Mr Smith's appetite, however, and orders additional diagnostic tests. At home that night, Mr Smith lies in the dark envisioning an endless set of painful tests and procedures leading to nowhere but death. In the morning, he takes the gun down from the shelf and loads it with ammunition. It sits on the desk for a week, always beckoning as an easier alternative to doing and being nothing. One night, Mr Smith writes a final note to his sons and ends his life.

Perhaps the most important feature of this fictional case is that depression remains unrecognized by the patient and the primary care physician who provides the patient's care. In part, symptoms of sadness, so predominant in younger cases of depression, are not present, but instead the patient conveys anhedonia or lack of interest in previously pleasurable activities coupled with reduced functioning in areas of personal and social responsibilities. Other symptoms are somatic and, given competing medical illnesses, may not be linked to the other symptoms of depression, so that the physician may miss the diagnosis. In part, these other comorbid illnesses take priority in the demands of the primary care physician's time. Finally, depression remains a stigmatized condition in the eyes of many older adults, so that the patient denies depression, making the problem of recognition and treatment even more difficult. Finally, the primary care physician did not routinely screen for potential means of suicide, for example, guns, other weapons, or overstocked medications.

In the case study, neither the patient nor the physician recognized the depression. Other scenarios are possible. The physician may recognize depression, but believe that treating it is less important than addressing the other medical problems. The physician may diagnose depression, but prescribe a subadequate dose of antidepressant. The physician may diagnose and recommend treatment, but have little time to discuss the issue with the patient who then refuses treatment. The patient may initiate treatment, but experience side effects and stop treatment before symptoms remit. Or, the patient may initiate treatment, but stop once symptoms begin to diminish and relapse not long after. For each scenario, an effective intervention would increase the likelihood of successful treatment of the patient's depression and reduction of suicide risk.

PROSPECT

Overview

The Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT) is a multisite study funded by the National Institute of Mental Health (NIMH) to test a model of depression recognition and treatment aimed at preventing and reducing suicidal behavior in older primary care patients. The study is a collaboration among the NIMH Intervention Research Centers (IRCs) of Cornell University, University of Pennsylvania, and University of Pittsburgh.

The collaborative model brings a number of advantages to the study, not the least of which is that it allows the study to draw on the wealth of experience and expertise from each center. As will be described below, the intervention attempts to effect meaningful clinical outcomes in a representative patient sample by changing the organization of care. The study design, therefore, necessarily integrates expertise and methodologies from multiple disciplines, ranging from treatment-focused clinical research to population-based epidemiology and services research.

The tasks needed to accomplish this study are shared among the three IRCs. Each IRC has three specific roles: contributing to the overall design and structure of the study, conducting the intervention in local primary care practices, and coordinating, with input from the other IRCs, the functions of a specific methodological core: Research Design and Assessments (Cornell), Intervention Development (Pittsburgh), and Data Management and Analysis (Pennsylvania). The Cornell group is responsible for overall coordination, including the integration of the three primary functions and the comparability of study implementation across the three centers and their primary care sites.

The multisite collaboration also helps recruit and follow a big enough study population from a large enough number of primary care practices so that the findings of PROSPECT will have broad generalizability. As described in more detail below, the study is collecting longitudinal data from approximately 1380 patients from 18 different primary care practices, most of which are not affiliated with an academic institution, and which range greatly in size and proximity to urban centers. The sociodemographic characteristics of the patient populations served by these practices also vary, including several populations that are more than 50% racial or ethnic

minorities. The study selects from each practice a representative sample of older patients, including an oversample of the very old, from which patients with mild-to-severe depression are identified, recruited, and followed prospectively.

Aims

The primary aims of PROSPECT are to test the following in a representative sample of older patients in primary care practices:

- The effectiveness of its proposed intervention in preventing and reducing suicidal ideation, hopelessness, and depression.

- The impact of the intervention on the initiation of treatment and outcomes (depression, disability, medical morbidity, cognitive dysfunction) in those patients whose characteristics place them at high risk for suicide.

- The effectiveness of the intervention in preventing and reducing sequelae or complications of depression associated with suicidal behavior, including substance abuse, sleep disturbances, pain, and disability in elderly patients with degressive signs and symptoms.

PROSPECT's intervention

PROSPECT's "guideline management" intervention implements procedures in primary care practices designed to facilitate the use of a comprehensive treatment algorithm for depression based on the Agency for Health Care Policy and Research (AHCPR) guidelines. In designing the intervention, the investigators drew not only from their clinical research, but also from the intervention studies for depression in mixed-aged or older primary care patients as well as studies of other chronic conditions of late life. The resulting intervention reflects several current trends in primary care practice: (i) using practice guidelines and/or critical pathways to guide treatment decisions; (ii) adding physician extenders for disease-specific case management (such as an anticoagulation nurse-specialist or diabetes nurse); and (iii) strengthening patient compliance with treatment regimens through patient and family education strategies. These components and their rationale are described in the following paragraphs.

PROSPECT's intervention begins with an algorithm for treating late-life depression in primary care settings through the acute, continuation, and maintenance phases. The algorithm draws heavily on the AHCPR practice guidelines for treating depression in primary care. PROSPECT investigators modified these guidelines by tailoring them for specific use in the elderly (eg, providing dosages for older patients) and by recommending a preferred sequence of treatment choices. Sequencing treatment choices reduces the heterogeneity in the kinds of specific treatments patients receive, while retaining the locus of treatment decisions with the physician, not the study. An important feature of the PROSPECT algorithm is that it is comprehensive, providing procedures for both the typical case and the atypical. At each step of the algorithm, physicians have the option of obtaining a consultation in psychiatry or referring a patient to a specialist with the expectation that upon completion of specialty care the patient will return to primary care.

The PROSPECT treatment algorithm recommends antidepressant therapy as first-line treatment with citalopram as the drug of choice. Citalopram was chosen because it is equally efficacious as other SSRIs and has an advantageous side-effect profile in use with the elderly. The study will provide citalopram to patients when prescribed by their physician. Physicians can consider other antidepressants if citalopram is contraindicated. If a patient does not want any antidepressant medication therapy, the physician can recommend psychotherapy. For the purposes of the study, the PROSPECT guideline recommends interpersonal therapy (IPT) and the study will provide IPT to patients for whom it is recommended.

It may be helpful to reiterate that the purpose of PROSPECT is not to test whether or not citalopram and IPT are efficacious in treating depression in elderly primary care patients. These therapies were chosen because evidence already indicates that they can be effective under ideal conditions. Rather, the challenge of PROSPECT is to facilitate the efficacious use of these treatments under less than ideal conditions. Part of the goal is to ensure that physicians use these treatments in a recommended fashion. Research has also shown that when primary care physicians do follow practice guidelines, their use can positively influence both the process of care (93% of 59 studies) and clinical outcomes of care (81% of 11 studies).[39] Under normal circumstances, how-

ever, physicians are slow to adopt practice guidelines. Adoption of depression guidelines may face even greater barriers than guidelines for other conditions, as depression remains a stigmatized condition, especially in older cohorts. Thus, physicians can feel uncomfortable about giving their patients a diagnosis of depression and patients and family may not want to acknowledge one. Further, depression is not a focus of most primary care physicians' training, so that some physicians consider it of secondary importance. Finally, comorbid medical illness, functional disability, and cognitive decline often complicate the diagnosis and treatment of depression and place competing demands on the physician and can make it more difficult for the patient to follow recommended treatment.

Controlled studies of the impact of different strategies to change physician behavior consistently indicate that traditional educational methods (eg, printed materials, lecture-style conferences) alone have little sustained impact on either physician behavior or patient outcomes.[40,41] In part, traditional educational methods are too general; generic information is removed from a specific patient's needs at a given time.[42] Coupled with the lack of specificity are the growing time demands on primary care practice that interfere with their ability to obtain the information needed to use the guidelines effectively. Time constraints have been specifically identified as a significant barrier to their treating depressed patients adequately.[43]

Approaches that most influenced physician adherence to practice guidelines employed patient-specific reminders or prompts at the time of consultation, thereby facilitating "on-time, on-target" treatment. The linchpin of the PROSPECT intervention is the addition of a health specialist (eg, nurse, social worker, or clinical psychologist) to the primary care setting who can obtain needed information from patients (symptoms, comorbid conditions, side effects, and treatment adherence) and to use this information in prompting physicians with on-time and on-target recommendations about appropriate care for their patients. The health specialist collaborates with the physicians by helping them recognize depression, offering timely and appropriately targeted treatment recommendations based on the treatment guidelines, monitoring the clinical status of patients, and encouraging patients to adhere to treatment. Additional procedures aim at educating patients, families, and physicians on depression and suicidal ideation. The approach is expected to lead to a reduction of depressive symptomatology and suicidal ideation and behavior in elderly primary care patients and to generate a practice model that has the ability to incorporate the advances of our clinical science.

An advantage of the health specialist is that the role combines the necessary "prompt" to the primary care physician about the timing of decisions in an algorithm of care (a task that has also been given to computers) with a way of extending the physician's ability to manage the treatment of depression over time. This use of physician extenders is a growing trend in primary care for the treatment management of other chronic illnesses, where, for example, an anticoagulation nurse-specialist or diabetes nurse spends time with the patient and family teaching them about the disease and its treatment and monitoring compliance with treatment and side effects. This approach integrates two other models that have been tested in primary care settings to improve the recognition and treatment of suicidal ideation or depression. Katon's intervention[44,45] was based on a collaborative model in which depressed mixed-aged patients were treated by both their primary care physician and a psychiatrist. On 4-month follow-up, the intervention led to greater decrease in depressive symptoms and signs than placebo in patients with major depression, but not minor depression. Nonetheless, the intervention improved medication compliance and satisfaction with care in all patients. A different approach provided physician treatment guidelines for their primary care patients with depression.[46] Consistent with the general literature on guideline adaptation, physician education alone resulted in greater recognition of depression, but not adequate treatment among those identified as depressed.

PROSPECT's guideline management intervention, like the physician-focused model, targets physician and patient adherence to treatment guidelines. Like the collaborative model, a specialist is integrated into the primary care setting, but in this case the specialist has the task of collaborating with the physician and increasing recognition of depression and adherence to specific treatment guidelines. An advantage of the guideline management model for elderly patients is that it is expected to increase both the acceptability to patients and usefulness to practices. In studies of primary care patients, the vast majority of depressed patients report preferring to receive help for emotional distress by their

primary care physician as opposed to a mental health specialist.[47] Further, when primary care patients are referred to mental health specialists, as many as half do not reach the specialist.[48,49] These findings in mixed-age groups might be even stronger in an elderly population as community studies report more negative attitudes towards mental health specialists among older than younger adults.[50] From the physician's perspective, guideline management keeps control of patient treatment in the hands of the primary care physician. As the majority of primary care physicians prefer treating their depressed patients themselves rather than referring them to others,[43] this approach is expected to be more acceptable to physicians, which if found feasible, increases the likelihood of its being adopted into general practice.

The difference between an intervention that facilitates the use of a guideline to identify and treat depression rather than prescribes the treatment for patients enrolled in the study is analogous to the difference within controlled treatment trials in analyses of intent-to-treat patients compared with treated patients. PROSPECT aims to test the effect of the intervention on reducing suicide risk in a sample of all practice patients, not just those who following the steps of the treatment algorithm. The analysis, however, will need to examine the extent to which the primary care physicians did adhere to the guideline's recommendations and the fidelity of the health specialist to the intervention prescribed by the interven-

tion. So, while the PROSPECT investigators have attempted to package in its intervention elements chosen to optimize the efficacy of treatment, its acceptability to patients, and usefulness to physicians, the possibility remains that the overwhelming time constraints faced by modern primary care and the unshakable stigma attached to depression will continue to undermine effective care. Conversely, to the extent that the PROSPECT intervention is successful, the study will have sufficient data to develop and then test hypotheses about the most critical components.

Primary care sites

To evaluate the impact of its intervention on patient outcomes, PROSPECT is collecting data from 18 separate primary care practices from 3 geographic areas (metropolitan and outlying New York, Philadelphia, and Pittsburgh). Practices were selected in pairs sharing similar characteristics in terms of academic affiliation, location (urban, suburban, or rural), size (number of physicians), and the race/ethnicity of the patients. All practices serve both managed-care and fee-for-service patients. As seen in *Table I,* the 9 pairs of practices represent considerable diversity including both academic and nonacademic urban practices, a wide range in patient racial/ethnic composition, including both academic and nonacademic practices with greater than 50% minority patients, and solo as well as large group practices.

The generalizability of PROSPECT findings to primary

Location	Number of practices	Practice location	Practice affiliation	Number of physicians per practice	Minority patients (%)
Cornell					
	2	Urban	Academic	44-48	50-60
	2	Suburban	Private	4-6	10-15
	2	Suburban	Private	1	5
Pennsylvania					
	2	Urban	Private	1-3	83-86
	2	Urban	Private	5-6	58-86
	2	Suburban	Private	3	2 - 8
Pittsburgh					
	2	Urban	Academic	9	21
	2	Suburban	Private	5-7	2
	2	Rural	Private	3-10	5-10

Table I. Characteristics of PROSPECT physician practices (n=18).

care throughout the United States is limited to some extent by the fact that practices were not randomly selected and are all located in the northeast. On the other hand, the heterogeneous characteristics of the recruited practices and their patients do extend the representative of PROSPECT findings beyond much previous research that was limited to academic-affiliated settings, predominately white patients, or single locations. In the United States, the vast majority (74%) of elderly adults live in a metropolitan area (1990 Census),[51] lending further generalizability to findings from the study.

Within each pair, practices were randomly selected to receive the guideline management intervention or "enhanced care," a less intense intervention consisting primarily of physician education and depression identification. Although acknowledging that identification of depression is an important part of clinical care, PROSPECT is not designed to evaluate different methods of identifying depression in primary care, for several reasons. First, previous research has shown that identification of depression in primary care alone has little effect on patient outcomes. Second, in order to evaluate the effect of the proposed intervention on patient outcomes, comparable assessment is needed in both intervention and usual care patients, necessitating integrating assessment into the research protocol. And third, for ethical reasons, physicians in both groups need to be informed of the results of these assessments, making a test of identification of depression by physicians nonfeasible in the context of the current study.

The decision to randomize by practice rather than by the individual physician or patient reflects several considerations. Most important is the nature of the intervention itself. As described above, the intervention involves the placement of a specialist into a practice to help physicians follow treatment guidelines. Although the study might require the specialist not to directly contact nonintervention patients if patients were randomized within a single practice, it is a likely—indeed hoped for—outcome of the study that the experience of the physician in working with the specialist in the long-term treatment of depression with intervention patients will "spill over" and affect the physician's care of his or her patients. Another option would be to randomize physicians within a single practice. This strategy might work if the physicians worked largely independently from each other, but, especially in smaller practices, the threat of contamination seems high. Potential bias resulting from

contamination in either scenario would dilute any effect of the intervention and be very difficult to correct in the analysis. In contrast, randomizing practices leads to two biases that are resolvable at the analysis stage: (i) bias created by treating the patient as the unit of analysis while the practice is the unit of randomization; and (ii) indication or selection bias rising from patient treatment that is not blinded to the diagnosis of depression. Both types of potential bias can be addressed using data-analytic strategies, the former by using random effects for patients and practices and the latter using instrumental variable modeling.[52]

A strength of PROSPECT is the involvement of several primary care practices with no prior history of academic research. The willingness of the physicians to participate is all the more noteworthy given the increased time demands on them and their staff in the past few years. These constraints pose an additional challenge to studies such as PROSPECT trying to fit literally into the office space and schedule. PROSPECT investigators have worked closely with the physicians, administrators, and office managers at each practice tailoring procedures to minimize office burden while facilitating access to data and space needed for the study methodology described below. At all practices, physicians met with investigators to review procedures, approve the PROSPECT patient recruitment letter, and receive a packet of baseline physician assessments. A separate in-service training was held for office support staff to review study procedures and discuss strategies for responding to patient phone calls concerning the study.

Patients

To study the effect of the intervention, PROSPECT collects longitudinal data on patients both from practices in which the guideline management intervention is implemented and the comparison enhanced care practices. Essential to PROSPECT's aims is the test of the intervention on patients who are representative of the primary care practice's total active patient population, not just patients who volunteer for the study or who are identified as needing treatment by practice physicians. Application of the public health model to intervention research is an essential ingredient differentiating clinical trials that test the efficacy of a treatment within a carefully chosen set of patients from studies of intervention effectiveness in more representative samples. Treatments

that are found efficacious in controlled settings may lack effectiveness for a variety of reasons, many deriving from characteristics of the patient as well as factors about the clinician. Of particular relevance to PROSPECT, patient volunteers are likely to differ from patients who do not volunteer by the severity of depression, coexisting medical illness, or functional disability, or attitudes and beliefs about mental health problems and their treatments, all factors that have been shown to also affect treatment initiation, adherence, and response[53,54]—that is, the likelihood that a patient might benefit from the intervention PROSPECT offers.

These patient selector factors may also affect primary care physician behavior. For example, patients with comorbid medical illness can pose greater difficulties in diagnosing depression, be less willing to acknowledge or discuss depressive symptoms, impose greater constraints on physician time. There is also a tendency for clinicians to undervalue the severity of depression and its impact on quality of life in older age. Finally, there may be problems in diagnosis associated with cognitive decline and medical comorbidity, and patient and family unwillingness to be treated or to adhere to treatment.

To obtain its representative sample, PROSPECT uses a stratified, 2-stage design aimed to include an oversample of very old subjects (over 75 years) as well as a disproportional number of patients with depressive symptoms. The key is being able to generalize back to the full practice population. A small number of patients without depressive symptoms are entered into the study both to accommodate the possibility of false negatives inherent in any screen and to investigate the intervention's effect on prevention and early detection of depression.

The sampling frame employed by PROSPECT is the weekly appointment system. PROSPECT investigators decided to select a sample of patients with scheduled upcoming appointments because this is the group for whom identification and treatment is most relevant in a primary care practice. Depression in patients who do not visit their doctors will not, by virtue of their absence, come to the attention of primary care physicians. The sampling frame also omits patients who make urgent visits to the practice on the rationale that intervention activities are not designed for use during emergency care, so that patients who show up for unscheduled visits are not appropriate for inclusion into the study at that time. Emergency patients who are at high risk for suicidal ideation or depression will, in most cases, be enrolled in the study through screening procedures conducted during a scheduled follow-up visit.

To keep the study as generalizable as possible, exclusion criteria are few. Eligible patients are community-dwelling (ie, do not live in a nursing home or other institution), age 60 and over, cognitively intact (evidenced by a score >17 on the Mini-Mental State Examination), able to give informed consent, and English-speaking. The study is limited to English-speaking patients both because opening the study to monolingual speakers of other languages would greatly increase the cost and complexity of providing intervention and research assessments and because the ability of English-speaking physicians to identify and treat depression in patients who do not speak English is likely compromised. If PROSPECT's intervention is successful, a next step will be extending the intervention to patients who do not speak English.

Over a period of 2 years, PROSPECT investigators will receive on a weekly basis the schedule of upcoming appointments. At each of the 3 study centers, the names and ages are entered into the study's administrative database. The computer identifies potentially eligible patients, including patients who meet the age criteria and have not already been sampled. As suicide risk is greatest in the oldest ages, but the number of patients declines with age, the oldest patients are oversampled by randomly selecting patients within age strata (60 to 74 and 75+ years). The primary care practice mails a letter to sampled patients informing them of the study and giving them an opportunity to refuse contact. Patients who do not refuse are screened for possible depression by telephone using the Centers for Epidemiologic Studies Depression (CESD) scale.[55]

A large number of patients need to be screened by the CESD in order to recruit approximately the final sample of 1380 patients who will be followed longitudinally by the study. The actual screening number will depend upon the results of the screen and the willingness of patients to participate in the longitudinal study. Using a conservative estimate of participation rates, the study is prepared to screen 11500 patients (6500 aged 60 to 74, 5000 aged 75 and over) with the CESD screen across the 18 primary care sites. While screening patients over the phone, their responses are scored directly into the computer, which calculates the total score and identifies which patients should be recruited into the study. Based on previous work[56] on the screening properties of the

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CESD for *Diagnostic and Statistical Manual of Mental Disorders* 4th ed (DSM-IV) major depression, all patients who score >20 on the CESD are recruited. As discussed above, a small sample (5%) of patients who score lower than 21 on the CESD are also recruited into the study. The computer keeps track of each patient's probability of selection at each stage of the sampling process for the purpose of investigating the generalizability of the study's sample to the primary care practice patient population as a whole. For example, at the completion of the study the investigators can calculate sampling weights for the purpose of estimating practice-based prevalence rates.

Patients who agree to recruitment are met at the practice for an in-person interview by research staff at a time proximate to the scheduled office visit. The purpose of this visit is to conduct, once informed consent is obtained, a rigorous assessment of depression as well as other clinical, neuropsychological, and social variables needed for the analyses of course and outcome of depression and suicide risk. In developing its research assessment battery, PROSPECT investigators had to balance the need for in-depth measures that adequately capture the complex interaction among depression, medical comorbidity, cognitive impairment, disability, lack of social support in the primary care population with the time, and other constraints of the primary setting.

Major and minor depressions are diagnosed with DSM-IV criteria using the Structured Clinical Interview for DSM-IV Diagnoses.[57] As noted when describing the intervention above, if a patient from an intervention site meets diagnostic criteria, the research staff informs the intervention's health specialist who will review the patient's chart, contact the physician with guideline recommendations, and otherwise initiate intervention procedures. In both intervention and enhanced care practices, information on any patient with evidence of suicide risk will be reported immediately to the primary care physician and a clinical investigator of the study. PROSPECT has formalized procedures for evaluating and addressing suicide risk in patients.

PROSPECT plans to recruit and follow 1380 patients (780 aged 60 to 74, 600 aged 75 and over). Approximately two thirds of these patients will be treated for major depression or minor depression, with most of the remainder having significant depressive symptomatology. An estimated 18% of the patients will report significant suicidal ideation at the time of their baseline interview. All recruited patients, in both intervention and enhanced care practices and regardless of diagnosis, are recontacted for brief telephone assessments at 4 and 8 months following their baseline interview to track depressive symptoms, suicide ideation, and health care utilization. The full assessment battery is readministered at two annual in-person follow-up interviews. Other sources of patient data include information drawn from medication and utilization records and death certificates if applicable.

Conclusions

Suicide behavior is a significant public health problem that is linked strongly to depression in late life. In the elderly, the prevalence rate of depression is substantial, yet rates of detection and treatment are far from adequate. Untreated depression has significant consequences with regard to suicide, as well as other sources of morbidity and mortality. Although suicide is a relatively low base rate behavior, a substantial proportion of late-life suicides have contact with primary care providers, offering an avenue of suicide prevention. PROSPECT will test whether the provision of adequate detection and treatment of depression in the primary care setting will reduce precursors to suicidal behavior, such as suicide ideation, hopelessness, and depression. If the PROSPECT intervention proves effective, this model of care holds promise for advancing the science and practice of treating late-life depression and the prevention of suicide. ❏

Esquema de intervención para prevenir el suicidio: PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial) (prevención del suicidio en personas de edad avanzada en atención primaria)

El suicidio es un problema creciente de salud pública por el alto riesgo en personas de edad avanzada. El presente artículo describe un enfoque terapéutico a fin de reducir el riesgo de suicidio mediante el tratamiento de la depresión de los sujetos de edad avanzada a nivel de la atención primaria. Combatir la depresión es un objectivo adecuado de la atención primaria, por la alta prevalencia que allí se observa, porque es un factor de riesgo importante de suicidio y porque se la trata inadecuadamente. PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial) (Prevención del suicido en personas de edad avanzada en atención primaria) es un estudio realizado en colaboración con el National Institute of Mental Health (NIMH) que examina este enfoque terapéutico de prevención del riesgo de suicidio en 18 unidades de atención primaria en los Estados Unidos. La intervención de PROSPECT que contiene "directrices tratamiento" introduce a un especialista en la atención primaria a fin de ayudar a los médicos generales a aplicar una terapéutica "a tiempo y de acuerdo a objectivos perseguidos" y un tratamiento a largo plazo de la depresión de comienzo tardío, cumpliendo directrices clínicas estrucuradas. La eficacia de la intervención en la reducción del riesgo de suicidio y depresión es evaluada siguiendo una muestra representativa de los pacientes de edad avanzada identificados por utilizar un esquema en dos etapas.

Elaboration d'une stratégie pour prévenir le suicide: PROSPECT (Prevention of Suicide in Primary Care Elderly : Collaborative Trial)

Le suicide constitue un problème majeur de santé publique et son risque s'avère particulièrement élevé chez le sujet trés âgé. Cet article décrit une approche qui vise à réduire le risque suicidaire en intervenant sur la dépression du sujet âgé dans le cadre de la médecine générale. La dépression est une cible interventionnelle appropriée : sa prévalence est élevée en médecine générale et, de plus, elle constitue un facteur de risque suicidaire majeur qui est plus souvent mal que bien traité. L'étude PROSPECT (Prevention of Suicide in Primary Care Elderly : Collaborative Trial) est un essai multicentrique, mené sous l'égide du NIMH (National Institute of Mental Health. Son objectif est d'évaluer une telle approche du risque suicidaire dans 18 centres de soins primaires, implantés aux Etats-Unis. La stratégie PROSPECT repose sur une liste structurée de recommandations cliniques mises en place par un spécialiste, qui sur la base de celle-ci, agit au sein du centre de soins en aidant les praticiens à choisir au bon moment le traitement et la prise en charge au long cours qui sont les mieux adaptés à la dépression du sujet âgé. L'efficacité d'une telle intervention dans la réduction du risque suicidaire et le contrôle de la dépression sera évaluée en suivant un échantillon représentatif de sujets âgés au moyen d'un plan en deux étapes.

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